**NAMING CHEMICALS – Lesson 1**

Text: Page 218 – 221, 226-227

Remember **bonding capacity** is the ability of an atom of an element to chemically connect with other atoms. The periodic table can be used to determine the number of bonds of an element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group** | 1 | 2 | 13 | 14 | 15 | 16 | 17 | 18 |
| **# Bonds** | 1 | 2 | 3 | 4 | 3 | 2 | 1 | 0 |
| **Example**  **Element** | Na | Be | Al | C | P | O | Cl | Ne |

Elements in groups 3 – 12 do **not** follow these bonding patterns and the teacher will always tell you the number of bonds made by these elements.

**Bond diagrams** show the bonding capacity and number of bonds. All bonds for an atom must be filled. Each hook represents a bond the atom wants to make. Sodium makes 1 bond, oxygen makes 2 bonds. Bond diagram for Na2O:

O

Na

Na

**Rules for Naming Chemicals (p 221)**

**1. Ionic Compounds – ionic bonds**

a) Name of the metal **first**, then the non-metal.

b) Change the ending of the non-metal to “ide”.

Example:

Na2O - sodium oxide

CaCl2 - calcium chloride

**2. Molecular Compound – covalent bonds (p 226)**

a) If both atoms are the same, the molecule name is the same as the element name.

b) Write the name of each non-metal.

c) For the first atom, add a prefix only if there is **more** than one atom.

For the second atom, add a prefix.

**NOTE: There are exceptions.**

d) Change the ending of the second atom to “ide”.

Prefixes

1 - mono

2 - di

3 - tri

4 - tetra

5 - penta

Examples**:**

H2O - dihydrogen monoxide, or water

CO2 - carbon dioxide

There are common names for some molecules. Please **memorize** these.

NH3 - ammonia

H2O2 - hydrogen peroxide

H2O - water

CH4­ - methane

­O­3 - ozone

**NAMING CHEMICALS – Lesson 1**

Text: Page 218 – 221, 226-227

Remember **bonding capacity** is the ability of an atom of an element to chemically connect with other atoms. The periodic table can be used to determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group** | 1 | 2 | 13 | 14 | 15 | 16 | 17 | 18 |
| **# Bonds** |  |  |  |  |  |  |  |  |
| **Example**  **Element** |  |  |  |  |  |  |  |  |

Elements in groups 3 – 12 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the teacher will always tell you the number of bonds made by these elements.

Bond diagrams show the bonding capacity and number of bonds. All bonds for an atom \_\_\_\_\_\_\_\_\_ be filled. Each hook represents a bond the atom wants to make. Sodium makes \_\_\_\_\_\_\_\_ bond, oxygen makes \_\_\_\_\_\_ bonds. Bond diagram for **Na2O**

**Rules for Naming Chemicals (p 221)**

**1. Ionic Compounds –** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example:

Na2O -

CaCl2 -

**2. Molecular Compounds –** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) If both atoms are the same, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b)Write the name of each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) For the first atom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For the second atom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Note: There are exceptions.

d) Change the ending of the second atom to \_\_\_\_\_\_\_\_\_\_\_

Prefixes

1 - \_\_\_\_\_\_\_\_\_\_\_\_ 2 - \_\_\_\_\_\_\_\_\_\_\_\_ 3 - \_\_\_\_\_\_\_\_\_ 4 - \_\_\_\_\_\_\_\_\_\_\_\_\_ 5 - \_\_\_\_\_\_\_\_\_\_\_\_\_

Examples**:**

H2O - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or water

CO2 - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are common names for some molecules. Please **memorize** these.

NH3 - ammonia

H2O2 - hydrogen peroxide

H2O - water

CH4­ - methane

­O­3 - ozone

**Practice Bond Diagrams**

Now try drawing and naming the following chemicals:

CaCl2 - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of bond? \_\_\_\_\_\_\_\_\_\_ Molecule or compound? \_\_\_\_\_\_\_\_\_\_

Bond capacity for calcium? \_\_\_\_\_ Bond capacity for chlorine? \_\_\_\_\_\_

Draw the Bond Diagram:

PBr3 - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of bond? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Molecule or compound? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bond capacity for phosphorus? \_\_\_\_\_ Bond capacity for bromine? \_\_\_\_\_\_

Draw the Bond Diagram:

**Bonding Capacity and Naming Chemicals – Worksheet 1**

**Read text p 218-221, 226-227 Pearson**

Each hook represents a bond an atom wants to make. Draw bonding diagrams for compounds formed from the following pairs of elements, write the formula, the name of the chemical and the type of bond. Remember all the “hooks” must be attached to another “hook”.

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Potassium and Oxygen** |  | Formula: |
| Combining Capacity of Potassium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Oxygen: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Lithium and Fluorine** |  | formula: |
| Combining Capacity of Lithium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Fluorine: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Calcium and Phosphorus** |  | formula: |
| Combining Capacity of Calcium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Phosphorus: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Aluminum and Sulphur** |  | formula: |
| Combining Capacity of Aluminum: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Sulphur: |

Make your own:

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_** |  | Formula: |
| Combining Capacity of \_\_\_\_\_\_\_\_\_\_ | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Bonding Capacity and Naming Chemicals – Worksheet 2**

Draw bonding diagrams for each molecule.

Name the chemical. If the chemical has covalent bonds circle **molecule** or circle **compound** for ionic bonds.

|  |  |  |
| --- | --- | --- |
| NaF  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | H2O  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | Na2O  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |
| CaCl2  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | AlCl3  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | CF4  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |
| K2S  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | Mg3P2  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | B2O3  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |

**TWENTY QUESTIONS ABOUT…**chemical formulas and combining capacity!

|  |  |
| --- | --- |
| 1. What is the bonding capacity for beryllium? |  |
| 2. What is the bonding capacity for nitrogen? |  |
| 3. What is the bonding capacity for sulphur? |  |
| 4. How many bonds can an atom of carbon make? |  |
| 5. What is the bonding capacity of Ca? |  |
| 6. Name a metal with a bonding capacity of 3. |  |
| 7. Name an element that does not bond with other elements. |  |
| 8. What is the bonding capacity of B? |  |
| 9. Name three elements that have a bonding capacity of 1. |  |
| 10. What is the chemical formula for magnesium chloride? |  |
| 11. What is the chemical formula for sodium fluoride? |  |
| 12. What is the chemical formula for aluminium oxide? |  |
| 13. Name three metals that have a bonding capacity of 2. |  |
| 14. Which non-metal has a bonding capacity of 1, O, F or S? |  |
| 15. Which non-metal has a bonding capacity of 3, N, C or Ar? |  |
| 16. Which metal has a bonding capacity of 2, K, Li or Mg? |  |
| 17. Which element has a bonding capacity of 1, Ne, Ar or Na? |  |